

What is claimed:

1. An electro-kinetic air transporter-conditioner system, comprising:  
an emitter electrode;  
a pair of collector electrodes that are downstream from said emitter electrode;  
an insulated driver electrode located between said pair of collector electrodes; and  
a high voltage source that provides a voltage potential to at least one of said emitter electrode  
and said pair of collector electrodes to thereby provide a potential different therebetween.
2. The system of claim 1, wherein:  
said emitter electrode is grounded;  
said pair of collector electrodes are negatively charged by said high voltage source; and  
said insulated driver electrode is grounded.
3. The system of claim 1, wherein said emitter electrode and said insulated driver electrode are  
at a same voltage potential.
4. The system of claim 1, wherein:  
said emitter electrode is at a first voltage potential;  
said pair of collector electrodes are at a second voltage potential different than said first  
voltage potential; and

said insulated driver electrode is at a third voltage potential different than said first and second voltage potentials.

5. The system of claim 1, wherein said emitter electrode is generally equidistant from a upstream end of each of said collector electrodes.

6. The system of claim 1, wherein said pair of collector electrodes and said insulated driver electrode each includes a corresponding upstream end closest to said emitter electrode and a downstream end farthest from said emitter electrode; and wherein the upstream end of the insulated driver electrode is set back a distance X from the upstream ends of the collector electrodes, the distance X being generally equal to a distance Y between said pair of collector electrodes.

7. The system of claim 1, wherein the insulated driver electrode is coated with an ozone reducing catalyst.

8. The system of claim 1, wherein the insulated driver includes an electrically conductive electrode covered by a dielectric material.

9. The system of claim 8, wherein the dielectric material is coated with an ozone reducing catalyst.

10. The system of claim 8, wherein the dielectric material comprises a non-electrically conductive ozone reducing catalyst.

11. The system of claim 8, wherein the electrically conductive electrode of the insulated driver electrode includes generally flat elongated sides that are generally parallel with said collector electrodes.

12. The system of claim 1, wherein said insulated driver electrode includes at least one wire or rod shaped electrode covered by a dielectric material.

13. The system of claim 1, wherein the driver electrode includes a row of wire or rod shaped electrodes each covered by a dielectric material, said row being generally parallel to said collector electrodes.

14. An electro-kinetic air transporter-conditioner system, comprising:  
an emitter array including at least one emitter electrode;  
a collector array including at least two collector electrodes;  
a driver array including an insulated driver electrode located between each pair of adjacent collector electrodes in said collector array; and  
a high voltage source that provides a voltage potential difference between said emitter array and said collector array.

15. The system of claim 14, wherein a further voltage potential difference exists between said collector array and said driver array, said further voltage potential difference causing charged particles produced near said emitter electrodes to be pushed toward said collector electrodes as the charged particles pass between air gaps between an insulated driver electrode and adjacent collector electrodes.

16. The system of claim 14, wherein:

said emitter array is grounded;

said collector array is negatively charged by said high voltage source; and

said driver array is grounded.

17. The system of claim 14, wherein said emitter array and said driver array are at a same voltage potential.

18. The system of claim 14, wherein:

said emitter array is at a first voltage potential;

said collector array is a second voltage potential different than said first voltage potential; and

said driver array is at a third voltage potential different than said first and second voltage potentials.

19. An electro-kinetic air transporter-conditioner system, comprising:
- an emitter array including at least one emitter electrode;
  - a collector array including at least two collector electrodes;
  - a driver array including an insulated driver electrode located between each pair of adjacent collector electrodes in said collector array; and
  - a high voltage source that provides a first voltage potential difference between said emitter array and said collector array, and a second voltage potential between said collector array and said driver array.
20. The system of claim 19, wherein said emitter array is grounded.
21. The system of claim 19, wherein said emitter array and said driver array are grounded, and wherein said collector array is receives a negative voltage potential from said high voltage source.
22. The system of claim 19, wherein each emitter electrode is generally equidistant from upstream ends of a closest pair of said collector electrodes.
23. The system of claim 19, wherein each collector electrode and each insulated driver electrode each includes a corresponding upstream end closest to said emitter array and a downstream end farthest from said emitter array; and wherein the upstream end of each insulated driver electrode is set back a distance X from the upstream ends of said collector electrodes, the distance X being generally equal to a distance Y between each pair of adjacent collector electrodes.

24. The system of claim 19, wherein at least one insulated driver electrode is coated with an ozone reducing catalyst.

25. The system of claim 19, wherein each insulated driver include an electrically conductive electrode covered by a dielectric material.

26. The system of claim 25, wherein the dielectric material is coated with an ozone reducing catalyst.

27. The system of claim 25, wherein the dielectric material comprises a non-electrically conductive ozone reducing catalyst.

28. The system of claim 25, wherein the electrically conductive electrode of each insulated driver electrode includes generally flat elongated sides that are generally parallel with said collector electrodes.

29. The system of claim 19, wherein each insulated driver electrode includes at least one wire or rod shaped electrode covered by a dielectric material.

30. The system of claim 19, wherein each driver electrode includes a row of wire or rod shaped electrodes each covered by a dielectric material, said row being generally parallel to said collector electrodes.

31. A method for providing an electro-kinetic air transporter-conditioner system with increased particle collecting efficiency, comprising:

providing an emitter electrode;

providing at least a pair of collector electrodes downstream from said emitter electrode;

providing a driver electrode between each pair of adjacent collector electrodes;

insulating each driver electrode with a dielectric; and

proving a voltage potential difference between each driver electrode and said collector electrodes that is greater than a voltage potential difference that could have been obtained, without arcing, if each driver electrode were not insulated.

32. A method for providing an electro-kinetic air transporter-conditioner system with increased particle collecting efficiency, comprising:

providing an emitter electrode;

providing at least a pair of collector electrodes downstream from said emitter electrode;

providing an insulated driver electrode between each pair of adjacent collector electrodes;

and

proving a voltage potential difference between each driver electrode and said collector electrodes that is greater than a voltage potential difference that could have been obtained, without arcing, if each driver electrode were not insulated.

33. The method of claim 32, further comprising:

coating at least one said insulated driver electrode with an ozone reducing catalyst.

34. An electro-kinetic air transporter-conditioner system, comprising:

an emitter electrode;

a collector electrode that is downstream from said emitter electrode;

an insulated driver electrode generally adjacent said a collector electrode; and

a high voltage source that provides a voltage potential to at least one of said emitter electrode and said collector electrode to thereby provide a potential different therebetween.

35. The system of claim 34, wherein:

said emitter electrode is grounded;

said collector electrode is negatively charged by said high voltage source; and

said insulated driver electrode is grounded.

36. The system of claim 34, wherein said emitter electrode and said insulated driver electrode are at a same voltage potential.



37. The system of claim 34, wherein:

said emitter electrode is at a first voltage potential;

said collector electrode is at a second voltage potential different than said first voltage potential; and

said insulated driver electrode is at a third voltage potential different than said first and second voltage potentials.

38. The system of claim 34, wherein the insulated driver electrode is coated with an ozone reducing catalyst.

39. The system of claim 34, wherein the insulated driver includes an electrically conductive electrode covered by a dielectric material.

40. The system of claim 39, wherein the dielectric material is coated with an ozone reducing catalyst.

41. The system of claim 39, wherein the dielectric material comprises a non-electrically conductive ozone reducing catalyst.

42. The system of claim 39, wherein the electrically conductive electrode of the insulated driver electrode includes generally flat elongated sides that are generally parallel with said collector electrodes.

43. The system of claim 34, wherein said insulated driver electrode includes at least one wire or rod shaped electrode covered by a dielectric material.

44. The system of claim 34, wherein the driver electrode includes a row of wire or rod shaped electrodes each covered by a dielectric material, said row being generally parallel to said collector electrode.

45. An electro-kinetic air transporter-conditioner system, comprising:  
an emitter electrode that is grounded or floating;  
a pair of collector electrodes that are downstream from said emitter electrode, said collector electrodes having a high negative voltage potential; and  
an insulated driver electrode located between said pair of collector electrodes.

46. The system of claim 45, wherein said insulated driver electrode is grounded or floating.

47. The system of claim 45, wherein said insulated driver electrode has a negative voltage potential that is less than said high negative voltage potential of said collector electrodes.

48. The system of claim 45, wherein said insulated driver electrode is has a positive voltage potential.

49. An electro-kinetic air transporter-conditioner system, comprising:

- an emitter electrode;
- a pair of collector electrodes that are downstream from said emitter electrode;
- an insulated driver electrode located between said pair of collector, wherein the insulated driver electrode is coated with an ozone reducing catalyst.;
- a high voltage source that provides a voltage potential to at least one of said emitter electrode and said pair of collector electrodes to thereby provide a potential different therebetween; and
- a lamp that can emit radiation in order to reduce the amount of microorganisms in air passing through said system, the radiation also irradiating the ozone reducing catalyst.

50. An electro-kinetic air transporter-conditioner system, comprising:

- an emitter electrode;
- a pair of collector electrodes that are downstream from said emitter electrode;
- an insulated driver electrode located between said pair of collector electrodes, said insulated driver including an electrically conductive electrode covered by a ceramic or porcelain insulating layer; and
- a high voltage source that provides a voltage potential to at least one of said emitter electrode and said pair of collector electrodes to thereby provide a potential different therebetween.

51. The system of claim 50, wherein:

- said emitter electrode is grounded;
- said pair of collector electrodes are negatively charged by said high voltage source; and

said insulated driver electrode is grounded.

52. The system of claim 50, wherein said emitter electrode and said insulated driver electrode are at a same voltage potential.

53. An electro-kinetic air transporter-conditioner system, comprising:  
an emitter array including N emitter electrodes, where N is an integer greater than or equal to 2;  
a collector array including N+1 collector electrodes located downstream from said emitter array;  
a driver array including an insulated driver electrode located between each pair of adjacent collector electrodes in said collector array; and  
a high voltage source that provides a voltage potential difference between said emitter array and said collector array;  
wherein each of a pair of outermost emitter electrodes is located closer to a corresponding outermost collector electrode, than to a next closest collector electrode.

54. The system of claim 53, where N is an integer greater than or equal to 3, and wherein each emitter electrode, that is not one of the pair of outermost emitter electrodes, is substantially equidistant from a closest pair of said collector electrodes.

55. The system of claim 53, wherein:

said emitter electrode is grounded;

said pair of collector electrodes are negatively charged by said high voltage source; and

said insulated driver electrode is grounded.

56. The system of claim 53, wherein said emitter electrode and said insulated driver electrode are at a same voltage potential.